Exhibit I

UNITED STATES DISTRICT COURT
SOUTHERN DISTRICT OF WEST VIRGINIA
CHARLESTON DIVISION

IN RE: ETHICON, INC., PELVIC REPAIR SYSTEM PRODUCTS LIABILITY LITIGATION	MASTER FILE NO. 2:12-MD-02327 MDL 2327 JOSEPH R. GOODWIN U.S. DISTRICT JUDGE

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This Document Relates To:
Margaret Stubblefield v. Ethicon, Inc., et al.
Case No. 2:12-cv-00842

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DEPOSITION OF SHELBY F. THAMES, Ph.D.

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Taken at Butler Snow
1020 Highland Colony Parkway, Suite 1400,
Ridgeland, Mississippi,
on Thursday, March 24, 2016,
beginning at approximately 12:29 p.m.

****

AMY M. KEY, RPR, CSR
Notary Public

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S T I P U L A T I O N

It is hereby stipulated and agreed by respective attorneys of record, that this deposition may be taken at the time and place hereinbefore set forth, by AMY M. KEY, Court Reporter and Notary Public, pursuant to the Rules;

That the formality of reading and signing is specifically RESERVED;

That all objections, except as to the form of the questions and the responsiveness of the answers, are reserved until such time as the deposition, or any part thereof, may be used or sought to be used in evidence.

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(EXHIBIT NOS. 1 THROUGH 3 PRE-MARKED.)

SHELBY F. THAMES, Ph.D.,

having been first duly sworn,

was examined and testified as follows:

EXAMINATION

BY MR. BOWMAN:

Q. Good afternoon, Dr. Thames. My name is Mike Bowman.

A. Good afternoon, sir.

Q. You've been handed Exhibit 1. Can you tell me if you've seen that document before?

A. I have not seen this document before.

Q. Does that look like a notice of deposition to you?

A. Oh, this Exhibit 1 here? I haven't seen this, no, sir.

Q. Could I see it for a second?

A. Sure.

Q. So it's been pre-marked as 1.

Have you had a chance to look through it?

A. Just glanced through it, yes, sir.

Q. And you did not see that before?

A. I have not.

Q. Do you see the name "Margaret Stubblefield" on there?

A. Let's see. Yes.

Q. Okay. I'm here representing her. You did a case-specific report for her mesh; is that right?

A. Yes, sir, I did.

Q. Do you know when you finished this report?

A. This is Thursday. I don't remember. It was one day last week, about ten days ago, so...

Q. I've also handed you another document, Doctor, that's been labeled Exhibit 2.

Do you see that there?

A. I do.

Q. Have you seen that document before?

A. No, sir.

Q. Well, I represent to you that that was provided to plaintiff's counsel with your expert report.

Have you had a chance to look through it at all?

A. No.

MR. HUTCHINSON: Counsel, do you have another copy?

MR. BOWMAN: I do.

BY MR. BOWMAN:

Q. Do you know who might have prepared this document, Doctor?

A. Are we talking about 2, sir?

Q. Yes, 2.

A. I have no idea.

Q. I'm going to guess by the color on the front that it was prepared by somebody at Exponent by the cover page.

Do you see that?

A. Yes.

Q. Would it make sense that somebody from Exponent prepared this document?

A. Yes.

Q. Actually, if this were in color, it would be a green and white cover page, which I typically see when I deal with Exponent documents.

A. Well, that looks like their style, and that's why my answer to your question.

Q. So do you understand that -- you understand that, in this case, that Kevin Ong did cleaning for you; is that right?

A. Yes, sir.

Q. Can you just take maybe two minutes or three minutes to review the document, Exhibit No. 2, and tell me if it looks anything like what you and Kevin Ong discussed?

A. Okay.

Q. Okay. Thank you.

MR. HUTCHINSON: Counsel, you stated that this was included with the e-mail. Are you talking about this document, Exhibit No. 2, was produced with the Stubblefield report?

Is that what you're telling us?

MR. BOWMAN: I believe it was produced as part of the Rule 26 report, so not with the amended Stubblefield.

MR. HUTCHINSON: Okay. And it wasn't produced with the original Stubblefield?

MR. BOWMAN: I don't think it was.

MR. HUTCHINSON: All right. I'm sorry. I think I misunderstood you then.

MR. BOWMAN: Okay.

MS. KROTTINGER: Is that the cleaning protocol?

MR. BOWMAN: It is, yeah.

MS. KROTTINGER: Yeah. That was produced with each case-specific report, the original one, not the amended one.

Does that make sense?

MR. BOWMAN: This is the handling protocol from -- it looks like the handling protocol from Exponent.

MS. KROTTINGER: Yes.

THE WITNESS: I've had a chance to glance through it, sir.

BY MR. BOWMAN:

Q. Does it refresh your recollection of what the document is?

A. I have never seen it before.

Q. Do you know what the document is after having looked through it?

A. Well, it is a recommended protocol for cleaning. And I think the second sentence, 1.2, says what it is actually. It's to evaluate the effects of different cleaning methods on clean surface texture and chemistry of the mesh material.

Q. Okay. So this --

A. Under 1.2.

Q. So you don't believe that this is in any way representative of the protocol that was used?

A. For what?

Q. To clean the meshes in the case?

A. My meshes?

Q. No, the mesh for Ms. Stubblefield.

A. No, sir.

Q. Okay. This is just the protocol that the lab used whenever they would handle a mesh; is that

right?

A. No, sir. This is not -- they didn't handle our meshes this way.

Q. Okay.

A. Our meshes were handled precisely the way they are in this cleaning report here.

Q. Okay.

A. We never used dimethylsulfoxide or nitric acid or any of these chemicals they're talking about.

This is a method -- the way I perceive this document is that they're taking this to evaluate the effects of different cleaning methods on clean surface textures and chemistry of mesh material.

Q. Okay.

A. So I don't know that they set this up as a cleaning protocol. It's a trial cleaning protocol, the way I evaluate the document.

Q. Okay. So one way or another, you haven't seen it before, and you don't know if it's been utilized in the Stubblefield case at all?

A. It has not been.

Q. Now, a minute ago you referenced the Stubblefield report. You actually referenced the

protocol that's in the amended Stubblefield report?

A. That is correct.

Q. And, as I understanded it, there was an outdated protocol that was part of the original Stubblefield report; is that correct?

A. Well, no, sir. What happened is in the process of putting the document together, the original protocol that we used for cleaning implants was placed into the Stubblefield report inadvertently, and not the more current one where we have reduced the time. We talked about that earlier.

The time of -- for instance, the first step was distilled water and heating at 70 degrees at 20 hours. In the original report, it was heated for 42 hours. And rather than drying by room temperature, it was dried under desiccation. So it's minor changes, but that's the case.

Q. And what's in the amended report represents your understanding of what was done by Mr. Ong; is that right?

A. Absolutely.

Q. As I understand it, he would do a cleaning. He would send it to you, and then you would send it back to him for cleaning; is that

right?

A. Yes, sir.

Q. What was done when it came back to you? Do you know?

A. When we received it, we did light microscopy, scanning electron microscopy and Fourier transform infrared spectroscopy analysis of the sample. And then we, of course, recorded that data. We sent it back to him. He does the next cleaning step. He sends it back to us. We repeat those three analyses and send it back to him, and that's done for five cleaning steps.

Q. So the five cleaning steps, is that independent to Ms. Stubblefield's case, or was that done in every case?

A. Every case.

Q. So why did you do it five times?

A. Well, our protocol was set up for five times -- excuse me. There's a case where we didn't do five. There's one case where we stopped after the second cleaning step, I believe. I don't remember the name. But it was because the explant itself was so clean there wasn't any need to go any farther. And we noticed that by SEM and by FTIR and light microscopy as well.

Q. So the samples come to you. You make a determination on whether or not they go back; is that right?

A. We typically will send them back, yes, sir.

Q. But the determination is made by you whether or not they get sent back?

A. Myself and Dr. Ong, we talk about together.

Q. And the maximum number of times that you sent this -- that you would send a sample through the cleaning protocol is five?

A. Five.

Q. Why did you choose five as a maximum number?

A. Well, we set this out originally to be our cleaning protocol. You were here earlier this morning when we testified why each step was done. I could go through that again if you would like for me to.

But we did that in order. And after each cleaning step, we evaluated the explant to make certain we weren't damaging it. We also wanted to get it as clean as we could, so we do it through five steps. In some cases, it hasn't taken that

much. But we went through five steps, irrespective of one sample.

Q. One sample for the Wave 1 case that you examined?

A. Yeah, that's right.

Q. Do you remember the name?

A. No.

Q. Can you tell me very quickly or even in a more detailed explanation what you mean when you say the sample was examined by light microscopy?

A. When the sample comes to us, we take it out and we put it under a light microscopy. We examine is pretty thoroughly and take photomicrographs of it. I'm going to -- it's best for me to answer this by referring to this report, which is Exhibit 3.

Q. Okay.

A. Is that okay my doing that?

Q. Yes, that's fine.

A. I'm looking on page 3. So on page 3, we've got a Gynemesh exemplar sample. And we always do an exemplar. Before cleaning -- and that you notice it says 20 times magnification in this bar.

So that's the kind of material that we're looking at. And, as you notice, it says figure 2 is

pristine kind of mesh, and that's before cleaning.

And then we look down at the sample. The Stubblefield sample is figure 3, label 1.3.1. That's before cleaning.

And so then we go from there, and we go take a photomicrograph of that on page 4 of the exhibit and figure 4. And we do that to see if -- during that process, we look to see if there are any fibers that may be sticking out from the mass of the implant and try to look for something that they would show us before we start the cleaning process.

There wasn't a whole lot here that was beyond the confines of the fatty mass that we found. But what was there is the type photomicrograph that was in figure 4.

Q. So sticking with the first light microscopy image, image 2, and that's on page 3, that's Gynemesh, correct?

A. Yeah.

Q. And you say it's labeled as pristine Gynemesh, GPSL, Lot K -- I'm sorry -- Lot CKB435 before cleaning?

A. Yes, sir.

Q. How many of these Gynemesh did you examine for the plaintiff-specific reports, if you know?

A. I don't know.

Q. So I'll be more specific. There are two general types of mesh at use in Ethicon's pelvic mesh products, correct?

A. There are several.

MR. HUTCHINSON: Object to form.

BY MR. BOWMAN:

Q. So there's SUI meshes and POP meshes, correct?

A. Yes.

Q. That are pure polypropylene?

MR. HUTCHINSON: Object to form, Counsel.

THE WITNESS: No, that's wrong. They're not pure polypropylene. None of the meshes that are used by Ethicon are pure polypropylene. They're all Prolene.

BY MR. BOWMAN:

Q. They're all Prolene?

A. And they all have additives, five of them, as a matter of fact. And we need to make that really clear here.

Q. I understand. The differentiation that I was making is that there is a Prolift+M, which is half polypropylene --

A. I'm sorry. You're speaking a little fast for me.

Q. Sure. There is Prolift+M that is made out of the ULTRAPRO mesh, and we're not talking about that in this case.

A. That's right.

Q. But what I'm trying to understand is that -- I want you to -- I don't know how many POP meshes you've examined for the plaintiff-specific reports. But I'm trying to figure out how many times you ran Gynemesh through -- this Gynemesh sample through the cleaning process, or did you have a different sample?

A. No, no. We ran it through the cleaning process at every point of the cleaning stage. We went through the 25 steps of the cleaning process, just like explant did. And we evaluated it at the end of every cleaning by light microscopy, FTIR, just like we evaluated this one.

Q. So did you do a new pristine Gynemesh sample for every case-specific report that had Gynemesh involved?

A. I'm not sure. I would have to refer back to what was used here.

Q. Well, the way I read this is --

A. Because we've got a sample -- when we received a sample from Dr. Ong, he sent us an exemplar which he used. He chose the appropriate one for her case. And so I think they're the same, from the same lot number, but I cannot testify specifically to that without looking at the documents.

Q. So did he -- do you know if Dr. Ong ran a new piece of pristine Gynemesh with every POP product that he looked at?

A. Yes.

Q. He did?

A. Yes.

Q. So this photograph in figure 2 is going to be different for another POP-specific case that you did -- I'm sorry -- for another POP case that you did a case-specific report on; is that right?

A. That's true.

MR. HUTCHINSON: Just so we're clear, POP, pelvic organ prolapse.

BY MR. BOWMAN:

Q. So I just wanted to make sure that we weren't working with -- I just wanted to make sure I understood what the report said.

A. Well, there were really -- if he runs it

through one time and photographs it and documents it, there really would be no need to run it through five, six, seven, eight times, but that's what's here.

Q. Right. But he didn't run the same piece of mesh through the protocol more than five times?

A. The same piece?

Q. Right.

A. No.

Q. Do you know how big this piece of mesh is before it was magnified.

A. Well, no. You can see the legend that shows the millimeters. It's not real big, but it's not as small as a lot of our explants. There's no need to have a large size, quite honestly.

Q. Did you handle these meshes as they came to you?

A. No, I did not handle them. My technical guy that works for me handles them. I saw them. I looked at them, but I didn't handle them. He takes care of that. He does the cleaning process -- or excuse me. He didn't clean them. He does the process of doing SEM, the optical microscopy and the FTIR. He's my technical assistant.

Q. Just so I can understand the protocol, the

untested sample from Steelgate or Roberson or wherever the mesh came from, it would come to your office. You would document it with FTIR and light microscopy?

A. It would come from Dr. Kevin Ong. He would get the sample, take it to Exponent, do the first step of the process. Actually, he would do -- let's see what steps we've got here. He would do the first two steps. After that, he would send it to me.

Q. So he did the first two steps, and then he would send it to you?

A. And we would then do light microscopy, FTIR, and scanning electron microscopy. We would send it back to him, and then he would do the third, the fourth and the fifth step and send it to me. We would do the sixth step, light microscopy, FTIR and scanning electron microscopy and send it back to him. He would do seven, step eight, nine, ten and -- nine through ten, and then he would send it back on the 11th step. That's how it progressed.

Q. So what was the purpose of actually sending the explant to your office?

A. We wanted to determine the progress of cleaning at each step rather than waiting until we

went through five steps and then here's the explant. We wanted to see the progress that was being made to clean the explant because we were identifying it at each step and running the scanning scopes, the FTIR and the optical photomicrographs so that we could get a feel for how it was being cleaned.

Q. And you saved all that data, and it's been produced to the plaintiffs; is that right?

A. Yes, sir.

Q. Do you know is all that data reproduced in this report?

A. Not in this report. I can't get all that data in this report.

Q. So I think -- well, I'll get to it later, but I think there are multiple FTIRs there.

A. Oh, there are some, yes. Wait a minute. We took more FTI- -- we took more scanning electron photomicrographs than we put in this report just for the volume of size. We selected some representative ones, but all that information has been provided to you.

Q. Okay. So the photos in this report don't necessarily represent the entire --

A. The totality.

Q. -- the totality of the mesh that you

examined; is that right?

A. Of the samples that we ran, right. That's correct.

Q. What about the data points? So all the FTIR is not on here. The SEMs and the light microscopy, they do not represent the totality of the images that you captured; is that right?

MR. HUTCHINSON: Object to form.

THE WITNESS: Whatever we did more than once, you have a copy of it.

BY MR. BOWMAN:

Q. But it's not in the report?

A. Some of -- no, sir, just because we didn't want the report to be so voluminous, so big.

MR. HUTCHINSON: Counsel, just for the record, we have e-mailed that information to you. We did that when?

MS. KROTTINGER: Tuesday.

MR. HUTCHINSON: Tuesday of this week.

MR. BOWMAN: Okay.

MR. HUTCHINSON: So we e-mailed all SEMs, all light microscopy and all FTIRs, everything that was done.

THE WITNESS: Everything that's done you have a copy of.

MR. BOWMAN: Okay.

BY MR. BOWMAN:

Q. Now, with respect to Ms. Stubblefield's mesh, on page 4, --

A. Yes, sir.

Q. -- you say that there's a higher magnification of 200 times?

A. Yes, sir.

Q. It says that it shows the fiber as encased within a dry and cracked proteinaceous layer?

A. Yes, sir.

Q. And that's represented in figures 4 and 5?

A. 4 and 5, yes, sir.

Q. Could you show me on 4 what you mean by the proteinaceous layer? Is that this --

A. This is a colored picture. It's this darker layer here. This is protein, fat, so forth, and here is the fiber. And 5 shows that right here. And then the other picture is after we -- it says this is Stubblefield after cleaning one. That's the fiber. So we took this and we cleaned it through the first step, and we got that.

Q. Okay. The first one, figure 4, is that 200 times magnification, and figure 5 is --

A. 200 magnification.

Q. But it's just a different portion of the mesh that you took a picture of?

A. That's right.

Q. Now, with respect to the -- sorry. Did you have more to say?

A. No.

Q. With respect to light microscopy, could you explain a little bit more about the process that you used to take the photos using light microscopy?

A. Well, you take the sample with a pair of tweezers very gently and you put it under the light microscopy lens, and you get a focus on it. You select the magnification, and you move it around very gently. And you try to get things in focus that would tell the story you wanted to tell, i.e., is there any damage here and what does it look like. What does the surface look like?

And when you can get something in focus and it looks like it's important, you snap a picture of it, and that's recorded. Part of that picture is recorded, and then it's sent back to whomever. And, from there, we print this picture out and put it in the report.

Q. So with respect to the photos 4 and 5, there's a background. What is the background? It

appears to be black.

A. Yes.

Q. What is that?

A. Typically, they use a carbon stub or a black piece of paper or a black background, yes, sir.

Q. Do you know -- so are the samples that you took with these photos, are they in solution, or are they just in room -- I'm sorry -- are they in ambient air, or what are they in?

A. They're in air.

Q. And that's just --

A. They're dry at this point in time. You know, he has cleaned them and dried them and sent them to us. So when we get them, they're dry.

Q. But you don't use any sort of enhancement techniques, say, putting them in fluid or any kind of oxygen-rich environment or nitrogen-rich environment. It's just straight room ambient air, and it gets put underneath a microscope and you snap a picture?

A. Yes, sir. And that's the way it is for all of our samples we evaluated for the FTIR and the SEM.

Q. With respect to the outermost layer -- and

I'm looking at figure 5 right now --

A. All right, sir.

Q. -- of Ms. Stubblefield's report.

A. Uh-huh (affirmative response).

Q. I see a lot of, I would say, transverse lines.

A. Can you see color on your computer?

Q. I can, yes.

A. Okay. Good.

Q. I can see color on my computer, and I know you don't have color in front of you. Because the report was produced a couple of days ago or maybe a day ago, I didn't have a chance to get to a color printer. So I'm working off my laptop, and you're working off --

A. I just wanted to make sure you could see it, because it tells you so much more than in black and white.

Q. Yes, I'm sure it does. So with respect to the way photo 5 is taken, the light is coming down from the microscope itself; is that right?

A. Yes, sir.

Q. Or is there another source of light inside the --

A. No, it's coming from the microscope

itself. And, also, we can adjust the light from the side to get a good -- so that we see the picture appropriately. So you've got light coming from the microscope, and you can adjust it from the side. I don't take the pictures. My technician does.

Q. So how familiar are you with light microscopy?

A. Well, just enough to use it. I don't take it -- I don't use it a lot.

But what do you mean by the question? I've used it for years.

Q. Sure. So what I meant by the question is that the way you just described it is that there's a light source coming directly out of the sample and then from the side, correct, or it can be from the side?

A. Or it can be at any angle. You can move it around so that you can get a better view, a better vision of what it is that you want to take a picture of.

Q. And if we look at the blue portion, the direct center of figure 5, you can actually see it pretty much all around the sample, but I'm going to stick to the center just for the sake of clarity.

There are what appear to be horizontal

cracks running along or horizontal lines. Let's just call them "lines" for the sake of this photograph.

A. They're 90-degree angles to the fiber.

Q. That's a good way of describing it. Now, how is it you ruled out the -- I'm sorry. Strike that, please.

Did you take into account any kind of refractive index associated with polypropylene?

A. Not for the light microscopy, we did not.

Q. So with respect to the surface of this sample, how is it that the outer layer appears to have -- how is it that we have the magnification of the outer layer so that we can see these cracks?

Did you do anything to enhance that at all?

A. Just focus the microscope.

Q. So this is exactly how it looked under the microscope?

A. Absolutely.

Q. If you had taken the refractive index of polypropylene into account, would that have had any effect on the photograph itself?

A. Not for the light microscopy. If you're talking about polarization of lights, then this --

polypropylene is birefringent, so that would come into play, but not here.

Q. And you didn't do any of that kind of testing for this specific report?

A. I have not for this report.

Q. Have you done it in the past?

A. Rarely. We find what we need by using light microscopy and scanning electron microscopy. It tells a story, along with FTIR.

Q. Okay. Now, you go on to talk about the chemical structure analysis by FTIR, microscopy. But I wanted to stick with this photograph, because I know that you made reference in the report to flakes not being blue.

So could you explain to me what you mean by that?

A. If you will look over here, I'll try to point this out.

THE WITNESS: Can I use your pen? Thank you, Chad.

BY MR. BOWMAN:

Q. That will be an exhibit. So if you mark it, it will go --

A. Do you want me to mark it? I can mark it?

Q. Yes, absolutely.

A. If you'll notice, I've drawn a circle around -- I'm going to put "clear." And then you'll see these areas right in here, "blue." And if you'll notice, they're cracked lines at 90-degree angles to the direction of the fiber.

And it's particularly interesting to look at the one I've marked "clear." You'll notice how the proteins have actually lost their adhesion to the fiber and are lifted up almost like this (indicating), like I'm doing my hand here. They were adhered, and now they're lifted up. And you can see that very clearly right here, and you can see the same thing here, but it's a little bit different angle.

The reason we know that these are both proteins is because we've done FTIR spectra of these. And if this particular explant -- and all of these, by the way -- and I found this in every one of the case-specific explants we looked at.

If this happened to be Prolene, then this would be blue, not translucent. This is translucent here. And you'll see underneath it, it looks a little different. That's pure -- that's the explant right here that I'm pointing to at the bottom of the clear mark on this exhibit.

So we've got translucent materials coming off of the clear fiber. We've got clear translucent material coming off the blue fiber. If this were Prolene flaking, it would be blue, and it's not.

So that photograph and others that I've taken show that this is not -- we are not seeing Prolene on the surface -- excuse me. We're not seeing proteins flaking from the -- let me back up.

We are seeing the fiber with a protein layer losing adhesion and physically rising from the explant in the form of a crack, and we see that both for the blue fiber and the clear fiber.

Point being, if it was Prolene cracking, the blue material we see rising up from Prolene would be blue. It would be the same color as Prolene, and it is not. It's translucent, just like the clear material from the clear fiber is translucent.

Q. So have you done any experiments to determine how thick a piece of bark or peeling off material would need to be to show color?

A. Well -- excuse me.

MR. HUTCHINSON: Object to form.

THE WITNESS: I think any piece would contain some particles of blue dye.

BY MR. BOWMAN:

Q. So we're talking about -- how thick do you think that this piece of outer layer is on this Prolene here that you've pointed out and circled there?

A. We have not measured that on that specific piece of fiber, but we've measured some similar to that before, and they're around 3 microns.

Q. So, just for reference, this had Gynemesh, and it would -- would you agree with me that the monofilaments used here are 3.5 mil?

MR. HUTCHINSON: Object to form.

THE WITNESS: I haven't measured them, but I think that's -- I don't believe that's accurate. I would think they would be thicker than that, but I didn't measure the thickness of the Gynemesh itself.

BY MR. BOWMAN:

Q. Do you know how thick the Gynemesh is supposed to be on the monofilament level?

A. I haven't looked at that.

Q. Do you know how thick the TVT is supposed to be on the monofilament level?

A. TVT, we measured those, and they're around 175 microns.

Q. You're dealing with microns. I know it as -- let me see if I can refresh your memory this way.

From reading the documents, I've read that the TVT is made out of monofilaments that are as thick as -- they're supposed to be as thick as 6 mil. And my understanding is --

A. That's 25.4 microns per mil. So that's about 150, 160, so that's 6 mils.

Q. And my understanding is that -- when we're saying six mils, is that 6/100 of an inch or --

A. 6/1,000 of an inch.

Q. Thank you.

So 6/100 of an inch would be an order of magnitude larger than what it actually is for TVT; is that right?

MR. HUTCHINSON: Object to form.

THE WITNESS: 6/100?

BY MR. BOWMAN:

Q. I'll withdraw the question.

In any event, with the Gynemesh, what we're actually looking at is we're looking at a very, very small amount of material that's peeling off.

And, frankly, on the exhibit that you have

there, --

A. Yes, sir.

Q. -- I actually -- if you could turn it my way, I'll point it out to you, because we are dealing with this diagram.

What I see here is I see a piece that is folded off, and then directly beneath it is a very strong blue color. And I see here a piece that is peeled off that actually appears to be clear.

Would you agree with those two statements, or what do you think?

MR. HUTCHINSON: Object to form.

THE WITNESS: Let me have your marker. Well, yes, that does look like blue beneath that. So I might have mislabeled that, because it might be a blue fiber. Let me check and see.

It is blue. My mistake. This should be changed to blue, because this translucent protein is coming up above this blue fiber here. And when I first glanced at it, I thought it was clear, but it's not. It's blue.

Can I have your pen? I'm going to mark through it, and this is on page 5 of Exhibit 3, and I'm going to change "clear" to "blue."

So this fiber is blue, and is this translucent material here is rising up from that fiber, which actually makes my point.

If this is polypropylene, it would be blue. It wouldn't be translucent. And we see that in all these explants. You're exactly right. It's blue.

BY MR. BOWMAN:

Q. So you understand my confusion, Doctor, because it looks like the blue fiber is actually part of the weave, and it also looks like the clear fiber is part of the weave there as well. So I don't understand that photo. You first identified it as clear, and now you've identified it as blue.

To me, it looks like the clear is coming off of a white fiber because it's paired with that other white fiber there.

Do you see that?

MR. HUTCHINSON: Object to form.

THE WITNESS: Yes, I do.

BY MR. BOWMAN:

Q. Then there is the blue fiber coming through. So I don't understand this picture.

MR. HUTCHINSON: Is there a question pending, Counsel? Because what I heard was,

"I don't understand this picture."

BY MR. BOWMAN:

Q. So can you explain to me why you changed your identification of that one as clear to now blue?

A. Sure. When I first looked at this, I saw the -- this is in a knotted area, a weave area that we're looking at. And when I first saw the area that I've changed and marked with a pen as clear, I didn't focus clearly enough on what was underneath the lifted portion of the proteins there. And it's blue underneath, not clear. And that was the mistake that I made and just didn't notice that. And then I did mark the blue area, which is blue.

But adjacent and on the left of the blue area, which I have changed from clear to blue, is a clear fiber, which also shows, below where the pen mark is, the proteins, how they are raising themselves up from the clear fiber, just as they did with the blue, and the part of the protein that is lifted and has lost adhesion and is beginning to flake off is translucent on the clear fiber just exactly like it's translucent on the blue fiber.

My point is this: If the materials that are coming off of the clear fiber were Prolene, they

would expect to be clear because the Prolene fiber was clear. If the material that's lifted up and is translucent and coming off the blue fiber, if it was Prolene, it would also be blue, and it is not blue. So, therefore, that material cannot be Prolene.

Q. Can you explain to me what your understanding is of how Prolene gets its blue color?

A. Yes. There is a phthalocyanine blue pigment added to it during the process of it.

Q. And that's the same time when the antioxidant's added; is that right?

A. That is correct.

Q. Now, that pigment obviously isn't added to the white portion, correct?

A. No. That is correct.

Q. So there are clear pellets of -- there are clear pellets of Prolene, and there are blue pellets of Prolene out there; is that right?

A. Yes, sir.

Q. And the extrusion of both, you wouldn't mix the two of them, would you?

A. Not with an extruder, no.

Q. Because then the color would be decreased? That would probably be the only difference between the two if they were both Prolene pellets, correct?

A. That's correct.

Q. So with respect to the blue pigment, I'm still trying to understand how it is you came to the conclusion that something so thin peeling off would show off as blue, which I actually don't see in these pictures, but how you came to the conclusion that using this technique you would be able to see blue in a piece of bark coming off of the Prolene suture?

MR. HUTCHINSON: Object to form.

THE WITNESS: When the fibers are made, the blue pigment -- it's not a dye. It's a pigment. It's added, and the blue pigment is dispersed throughout the entire piece of blue fiber. The outer portion of the blue fiber cannot be excluded having blue pigments, because it's one mass of material.

So when it's extruded from the extruder, blue pigment particles are throughout. When it's put in the body, it's blue pigment particles throughout.

Therefore, if there is oxidation of blue Prolene pigments -- or blue Prolene fiber, you will see that oxidation product being blue and not translucent.

BY MR. BOWMAN:

Q. But in answer to my question, you haven't done any research to confirm that?

A. That's research. What you're looking at is research.

Q. So what you circled originally as clear and then you changed to blue is the research?

MR. HUTCHINSON: Object to form.

THE WITNESS: Well, it's research in the sense that we were looking to see what -- we had an explant here that we were trying to evaluate and determine what happened to that explant during the time it was in Ms. Stubblefield. And we've used a very -- basically, we just cleaned it with water here. And we've looked at it again, a little sodium hypochlorite, and here we see these fibrous materials coming off of the white and the blue pigment -- or fibers. Excuse me.

BY MR. BOWMAN:

Q. Isn't it just as likely that the material that's flaking off is actually reflecting light into this medium?

A. No.

Q. Why not?

A. It's too obvious here. If you look at this -- and this is just one photomicrograph. We've got others. It is very clear that this is not just light -- I'm not sure what you said.

Q. Reflecting.

A. Reflecting, no. Otherwise, the entire issue would be light reflecting, and that's not the case.

Q. Why isn't it?

A. It's just not. That's not the way microscopy works.

Q. Honestly, I still can't find anywhere here with a blue piece that is flaking off. I do see that there are blue outlines that seem to have, you know, some sort of pattern associated with them, especially at the turns. There are breaks there.

Do you see those?

MR. HUTCHINSON: Wait a minute. Object to form. Compound question.

What's the question pending, Counsel? I'm sorry.

BY MR. BOWMAN:

Q. The question I asked is, did you see the breaks and the turns of the blue suture through the mesh?

A. I don't see any breaks in the suture at all.

Q. Can I show you? So there are horizontal cracks here, here, here and here.

Do you see those?

MR. HUTCHINSON: Object to form.

THE WITNESS: Yes. Those are cracks, and that's protein cracking. That is not the fiber.

BY MR. BOWMAN:

Q. So the protein is -- it's a clear material that will still show us blue underneath?

MR. HUTCHINSON: Object to form.

THE WITNESS: Let me see if I can show you what I'm talking about. If I take a piece of paper, a thin piece of paper, and, all of a sudden, I take the thin piece of paper and lay it on top of another piece of paper and the two dislodge from each other, one loses adhesions and one raises up, if it's translucent, I can see through it into a blue fiber, but it will be translucent. And that's what we're seeing here.

BY MR. BOWMAN:

Q. So that actually brings me back to my

question earlier, which is, why isn't light reflecting through oxidized polypropylene?

Why isn't that just as possible as the idea that it's protein?

MR. HUTCHINSON: Objection. It's been asked and answered.

THE WITNESS: You're asking me if you take a colored photograph of something, everything should be the same color. That's basically your question to me, and that's not the way it works.

BY MR. BOWMAN:

Q. I was actually using the example that you just used to explain why there wasn't this outer layer on the mesh itself that you could see through.

If light is passing through, then why isn't light also bouncing back?

MR. HUTCHINSON: Objection. Form.

THE WITNESS: I'm trying to explain to you why the allegations that have been made are that what we see here is oxidized polypropylene. And you have a wonderful example here of the fact that if it's oxidized polypropylene and it's losing its adhesion to propylene, then it would be blue

just like propylene is blue, and it is not.
So, therefore, it is not propylene.
BY MR. BOWMAN:
Q. I don't think you answered my question, Doctor. What I'm trying to get at is I'm trying to find the basis of your conclusion here that, number one, and I'll stick to the -- I'll go in parts.
The first thing I want to know is why you think that the flaked-off layers would -- you would be able to see a blue hue in them?
A. Why?
Q. Yes. Why?
A. Because they're blue. They should have the pigment in them. And if they have pigment particles in them, just like the rest of the Prolene, they would be blue.
Q. Irrespective of the --
MR. HUTCHINSON: I'm sorry. Dr. Thames, go on and finish your answer.
THE WITNESS: And since they are not blue, it means that they are not Prolene.
BY MR. BOWMAN:
Q. Now, it's interesting you keep saying that, because everything in this photo looks kind of blue to me, and I think it's because of the black

backdrop and because of the fact that there is clear/blue here.

So the idea that something isn't blue, I'd really like you to point it out.

MR. HUTCHINSON: Objection. Counsel, that's also argumentative. You're asking this witness to interpret what you see in this photograph, which clearly cannot be done.

MR. BOWMAN: Well, the photograph will be shown to the jury. That's for sure.

MR. HUTCHINSON: Good. So please reformulate your question, please.

BY MR. BOWMAN:

Q. The question is, how is it that you can say that the flaked-off material in the two positions that you've indicated in Exhibit 3 do not have blue associated with them?

MR. HUTCHINSON: Objection. That's been asked and answered. Last time.

THE WITNESS: I'm marking another area, and I'm going to call it "clear." And here is the flake from the clear Prolene sample, no pigment in it, and you see that it is clear.

When you look -- if you look right here, you see blue, blue right there. But this flake is translucent. And this is a translucent covering over this blue fiber, and that flake is lifted up above that fiber. The flake is not blue.

MR. MONSOUR: I don't mean to interrupt. Can I ask you a question, though, since you're pointing this out?

You're talking about this piece right here that's kind of sticking off right there?

THE WITNESS: No, sir. I'm talking about this piece right here. You see, this is the clear fiber and it's under the -- where I said blue at the very top, I marked through clear and put blue. There's blue where my pen is located right here.

MR. MONSOUR: Yeah, I see that's blue.

THE WITNESS: And then directly above it is translucent.

MR. MONSOUR: It is?

THE WITNESS: And you see this entire sheath that's covering this fiber is translucent? This is a blue fiber, and this sheath around it is translucent.

MR. MONSOUR: So what you're saying is this is a blue fiber, and there is white stuff or translucent stuff on top of it?

THE WITNESS: And that's proteins.

MR. MONSOUR: What's this?

THE WITNESS: This is a clear fiber where it's flaking too, and that's protein as well, and it's clear. Clear fiber should be clear. This should be blue if this is Prolene, and it's not.

MR. MONSOUR: Okay. I think I see. I was totally lost. Sorry, Mike.

MR. BOWMAN: That's fine.

BY MR. BOWMAN:

Q. So I think we've established that you found -- you found what you've identified on this Exhibit 3 as being two blue portions that have clear flakes and a clear portion that has clear flakes; is that right, Doctor?

MR. HUTCHINSON: Object to form.

THE WITNESS: You're going to have to restate that and slow down.

BY MR. BOWMAN:

Q. On the picture that you have in front of you, you have identified two portions of blue suture

that have clear flakes; is that right?

A. Yes, translucent flakes.

Q. And then you have identified one portion from a clear suture that has a translucent flake; is that right?

A. Yes, sir, correct.

Q. So that was the first part of what I'm asking you.

The second part of what I'm asking you is, do you have anything to back up the fact that -- what you've just found?

MR. HUTCHINSON: Objection. Asked and answered.

THE WITNESS: I think I have described it as efficiently as I am capable of describing it.

BY MR. BOWMAN:

Q. But you don't have any research to back it up?

MR. HUTCHINSON: Objection. That's been asked and answered. He's already told you he's done research on it.

THE WITNESS: What is your definition of "research"?

BY MR. BOWMAN:

Q. Something in a peer review.
A. Peer review?
Q. Yes.
A. Sir, we do research to put stuff in the peer review. Not everything that's researched is in the peer review.
Q. I understand that. But you don't have anything in a peer review to support what you're stating in this report for Ms. Stubblefield; is that right?
MR. HUTCHINSON: Object to form.
THE WITNESS: Peer review? This will go in the literature to be peer reviewed. But, no, this is my finding, and I think it's very clear and that most anyone will be able to understand it. Because not only do we find this here, we find it in 19 other cases just like this.
BY MR. BOWMAN:
Q. Okay. So with respect to -- getting back to the report, it says -- on the second paragraph, it says, "FTIR analysis of the flaked and peeling material from both clear and blue fibers are consistent and further confirms the cracked and peeling materials are proteins, not Prolene."

Do you see that?

A. Yes, I do.

Q. Where are those FTIRs?

A. My FTIR analysis starts on page 5 -- 6, excuse me, of this report. And if you'll notice in the top left, it says, "Stubblefield 1.3.1, before cleaning clear fiber FTIR or micro." That's before any cleaning has been done.

And then this is the FTIR spectra. And you'll notice that what we see here is that we see the peaks that are characteristic of polypropylene or, in this case, Prolene that are marked in blue. And then you see peaks down here that say, "Protein amide carbonyl stretching." It's marked, so that's protein here. And you see, "Protein N-H stretch," over to the left around 3300.

So this FTIR shows you that we are seeing proteins and Prolene.

Q. Okay.

A. All right. And it shows you where the picture was taken, the photomicrograph was taken, in the top right-hand corner.

Q. So this -- but if we look at the top right-hand corner, I don't see a flaked or peeling portion there, do you?

A. We're not necessarily looking for a flaked or peeling portion there, sir.

Q. Okay. So that was my question, because that's what the paragraph says here back on page 5. It says, "FTIR analysis of the flaked and peeling material" --

MR. HUTCHINSON: Counsel, can you slow down for me?

MR. BOWMAN: Sure.

BY MR. BOWMAN:

Q. Do you see it on page 5?

A. Yes.

Q. So it says that FTIR was done on flaked and peeling material, doesn't it?

A. I'm going to read this for you.

Q. Okay.

A. It's the before cleaning fiber FTIR spectra, figure 6, which is the one I'm referring to, shows spectral components of both polypropylene and proteins as noted by the highlighted 3291 and 1651 reciprocal centimeter frequencies respectively. These adsorption frequencies are attributed to the protein amide N-H stretching in the 3300 centimeter region and the amide 1 carbonyl stretching in the region of 16 to 1690 reciprocal centimeter region as

noted by Kong, et al., respectively.

Polypropylene adsorption frequencies are also present at 1449 and 1378 reciprocal centimeters due to penetration of the IR beam through the protein layer and into the polypropylene fiber.

That's what it says, nothing like what you asked me.

Q. Thank you for reading from the report, Doctor.

The second paragraph on page 5, it states that, "FTIR analysis of the flaked and peeling material from both clear and blue fibers are consistent and further confirms the cracked and peeling materials are proteins, not Prolene."

Where are those FTIRs?

A. Okay. Let's look at them. On page 7, figure 7, Stubblefield, this is photomicrograph of tissue taken between the fibers. In other words, you've got fibers laying out here, and we took a photomicrograph between the fibers, not in the area of the fibers. And it was overlaid with a collagenase, which is a protein reference spectra that comes from a library.

And you'll notice that the blue is the spectra from the tissue. The red is from the

control collagenase. You'll notice that every peak in the fiber -- the FTIR between fibers as there is in collagenase. So we show protein. Okay?

Q. Yes.

A. Are you okay with that?

Q. Respectfully, that wasn't the question I asked.

A. I'm going to answer your question.

Q. All right.

A. And you also see a blue spectra that's not in the collagenase. It's at 1742.

Q. Yes, I see that.

A. We'll get to that.

Q. Okay.

A. If you go to the next spectra, which is figure 8, this is the -- if you look at the top left-hand corner, Stubblefield 1.3.1, before cleaning tissue between fibers FTIR micro. And then it's compared to before cleaning the blue tissue FTIR micro.

So you see both the blue and the -- before cleaning tissue between FTIR micro, blue tissue. Okay. This is before cleaning the blue tissue. This is the peak of the blue tissue micro.

You'll see that the blue tissue has the

same materials on it as the blue fiber with the FTIR micro. So we've got blue and clear tissue here that's got the same FTIR spectra.

Now, let's go to the next one.

Q. Before we keep going, because I only have a certain amount of time, I want to just withdraw my question, and I need to ask a much more specific question.

A. All right.

Q. Did you take any of the peeling and flaked material and run FTIR on it?

A. You mean take it with a pair of tweezers?

Q. Yes, sir.

A. You couldn't do that. It's too small.

Q. So why does that statement there on page 5 that says you did the analysis of the flaked and peeling material, why is that there if you didn't do it?

A. Because I looked at those flaked --

MR. HUTCHINSON: Object to form. The witness has told you he did do it.

MR. BOWMAN: Actually, he didn't tell me he did it.

THE WITNESS: Well, I did it by looking on the implant. You can see where it is, and

we showed proteins are there. We showed that they're there. And then we kept cleaning, and, finally, the proteins are gone.

And you're dismissing the part of the cleaning process completely when you stay on one photomicrograph. This is -- we go from before cleaning through 25 steps, and you can see progressively how these proteins are lost. And you can look at -- if you really want to know the real truth, go to page 9.

BY MR. BOWMAN:

Q. Doctor, I'm going to ask you to stop answering. Because, like I said, I only have so much time, and I do have questions about the rest of the report.

A. Okay.

Q. Now, with respect to what's on page 5, there is figure 5, and it says after cleaning 1. And you've already marked it in Exhibit 3 as you saw at least three places where there was flaked material.

A. At least.

Q. For the record, did you ever run FTIR on the flaked material that you see in Exhibit 3 --

A. Yes, we did.

Q. -- on page 5?

A. We did that when we took this sample, and we found a sample where there was flaked material, and we did the FTIR analysis of that.

Q. You picked it up with tweezers?

A. No, we did not. We did the FTIR analysis. And what I was trying to get at over here is it showed both proteins -- those spectra showed both proteins and the Prolene fiber.

And as we cleaned it, the protein peaks went away. To begin with, you saw both proteins and Prolene. In the next spectra, you would see less proteins and then Prolene.

So, therefore, the fact is simple that, well, it was protein because they were cleaned off and were left of a blue fiber, and that's what page 5 tells us.

Q. Okay. Continuing on page 5, it says, "The presence of a thin remaining translucent protein layer on a Prolene fiber after flesh had been mechanically removed proves a strong protein adsorption and a strong adhesive bond formation between the adsorbed proteins and Prolene."

Do you see that?

A. Yes, sir.

Q. And that's consistent with what you testified about within your general deposition with respect to the use of formaldehyde or formalin; is that right?

A. Yes, sir, but not only formalin and formaldehyde. I said proteins themselves have a strong adhesive bond, if you'll remember that part.

Q. I do remember. Thank you.

A. Okay.

Q. Going to the next paragraph, the before cleaning fiber FTIR spectra, do you see that?

A. I do.

Q. You point out that, figure 6, "spectral components of both polypropylene and proteins as highlighted by bands at 3291 and 1651."

Do you see that?

A. Yes, I do.

Q. What are you looking for in those bands?

A. I want to show that when we look at these cleaned fibers, that the first cleaning steps, the FTIR spectra shows your proteins are there and Prolene is there. And as we clean, as we go through this cleaning process that I've talked about all morning long, as you go from step one, step two, step three, step four, step five, more and more

proteins are cleaned off. And, finally, you look at a FTIR spectra and you're seeing only Prolene, and that's shown on page 9.

Q. Okay. And I get the progression of your report, Doctor, and I appreciate --

A. And the spectra shows protein and Prolene, protein and Prolene.

Q. I get the progression of your report, Doctor, and I also understand that the progression of the report was done at your direction, correct?

A. Yes, sir.

Q. So if you saw proteins on FTIR, then you sent it back for more cleaning; is that right?

A. Correct.

Q. Now, with respect to Ms. Stubblefield on Exhibit 6, we are looking at the before cleaning FTIR.

Do you see that, figure 6, on page 6?

A. You said Exhibit 6.

Q. I'm sorry. It's Exhibit 3 still.

A. Figure 6?

Q. Yes.

A. Yes.

Q. Now, you point out the protein amide 1 carbonyl stretch?

A. Yes, sir.
Q. And you state that that is at 16; is that right?
A. Yes, sir.
Q. And that's a broad peak, right, on the FTIR?
A. Yes, sir, it is.
Q. With respect to the protein amide nitrogen hydrogen stretching that you point out at 3290, is that a broad peak?
A. Yes, it is.
Q. With respect to -- do you see any hydroxyl groups showing up in this FTIR?
A. I don't think you can distinguish a hydroxyl group here. It's too broad in the 33-, 32-, 3100 range.
Q. Well, let's start there.
Where would a hydroxyl group show up?
A. In the same general area as the NHP would show up. There is a fairly -- you can see that the resolution is not as good there as it is over in the frequency range right at 1700.
Q. So there could be hydroxyl groups there or no?
A. There could be, but I don't think they're

shown in this curve, because there may be a very small amount that's overridden or oversaturated by other things that are there.

Q. And could that be the amide group?

A. It could be.

Q. Now, with respect to the protocol used on Ms. Stubblefield's mesh, what was done to protect the possibility that hydroxyl groups were there?

A. What hydroxyl groups?

Q. On the surface of her mesh.

A. From what?

Q. Oxidized polypropylene?

A. No. You're going to get carbonyl groups first. You're going to get the C=O bonds, which are going to show at the 1700 range.

Q. So my question is --

A. And much more easier to define.

Q. So my question is, what was done to protect the presence of hydroxyl groups on Ms. Stubblefield's mesh?

A. Okay. Very good question.

Very mild cleaning conditions as we've set up here in this protocol.

Q. Okay. Very mild cleaning conditions.

Did you at any point run oxidized

polypropylene through your protocol?

A. No, sir, I have not.

Q. Do you know what would happen if you ran purposefully oxidized polypropylene through your protocol?

A. Yes, sir, I think I do.

Q. And what would happen?

A. You would have the same thing at the end that you started with at the beginning, just like an exemplar.

Q. And you're speaking about polypropylene with carbonyls; is that correct?

A. I'm speaking about Prolene. When we talk -- see, I'm not talking about polypropylene.

Q. I keep mixing that up.

A. I'm here today to talk to you about Prolene, P-R-O-L-E-N-E.

Q. Which is Ethicon's priority blend of --

A. And the answers that I've inadvertently given you when you asked about polypropylene, I was making the assumption, which is wrong, that you were talking about Prolene.

Q. I've been speaking specifically about Ms. Stubblefield's case, so we've been talking about Prolene all day.

A. Okay.

Q. Now, with -- I just wanted to -- you know, I wanted to find out if any steps had been taken to protect the possibility that carboxyl groups were on her mesh.

Did you understand that question?

A. I did. I answered it, too.

Q. And you did answer it.

With respect to the peak that shows up at 1740, --

A. Yes, sir.

Q. -- what would -- what does that tell you, that peak at 1740?

A. That tells me -- I received two or three implants that were dry, that were not in formaldehyde. And those particular samples had the same frequency as we're looking here at 1740. And that's due to decomposition of the flesh. And that's referenced by Notter and Stuart. It's very clear. There's a very fine article on that.

And so, in my opinion, somewhere along the way, this explant was left out long enough for decomposition to begin.

Q. With respect to 1740, that's a peak at 1740, correct?

A. It is.

Q. And I believe earlier today you testified that a peak at 1740 is indicative of a carbonyl group; is that right?

A. Yes, it is.

Q. Now, what was done with respect to Ms. Stubblefield's mesh to protect the possibility that she had oxidized polypropylene on her mesh with respect to the carbonyl that's there?

A. We took Ms. Stubblefield's explant, and we put it through the cleaning protocol that I know you're familiar with, because you've been here all morning and we've talked about it. And that's a very mild cleaning protocol, and it was developed for its mildness because it would not cause any undue reactions with the polypropylene -- or the Prolene mesh and, therefore, would not change it from its original shape or form or composition when it came out of the patient.

Q. And I understand that. But my question was specific to oxidized polypropylene -- I'm sorry. My question was specific to oxidized Prolene that came out of that -- that might have come out of Ms. Stubblefield.

What steps were taken to prevent oxidized

Prolene with reacting with your protocol?

MR. HUTCHINSON: Object to form.

THE WITNESS: I just answered your question. That's the answer to your question.

BY MR. BOWMAN:

Q. The answer that you gave me was that it would stay in the same way that it was when it came out of the patient.

A. Well, isn't that protecting whatever was there?

You asked me a question, how do I go about protecting the explant from changing whatever was there? And you used hydroxyl, which I don't think happens. So I'm going to say whatever might have been there such that when we finally looked at it, it was in the same shape, form and composition, and that's why this mild cleaning protocol was set up, and that's why we did it that way. And there was no oxidation going on.

Q. But isn't the -- you've already testified that your protocol was used five times with respect to Ms. Stubblefield and that it was at your direction when it was sent back for each cleaning process, correct?

A. And at no time did we see anything in the interim between those steps that's reported here in this cleaning process where we did light microscopy, FTIR or SEM did we see anything that suggested that there was any oxidation there. All of the spectra are here, and that's why we've included it in here, all of those spectra.

Q. So with respect to the FTIR that we're looking at, I've already given you two ranges, one where a hydroxyl group would be and one where a carbonyl is.

Did you run a control where you had a piece of Prolene that had a hydroxyl group on it or had a carbonyl on it and run it through your protocol to make sure that your protocol did not destroy that oxidized Prolene?

A. I ran an exemplar of Prolene and found that nothing changed on its surface during this period of time, which means that, therefore, if there was something on the explant, it would still be there when I finally got through step five, that I would not have removed it, and it would still be there.

Q. I tend to agree with the answer you've given --

A. Well, good.

Q. -- if we assume that no oxidized polypropylene is on the explant.

What did you do to protect any oxidized Prolene that might have been on Ms. Stubblefield's mesh?

MR. HUTCHINSON: Object to form. That's been asked and answered, Counsel, several times. You just don't like the answer this expert is giving you. So last time, and then I'm instructing the witness not to answer.

MR. BOWMAN: I'm trying to find out if he destroyed evidence. That's all I'm doing here.

MR. HUTCHINSON: Well, you've asked the question three times, and you don't like the answer. So my point is --

MR. BOWMAN: Technically, I'm not getting an answer. Every answer I'm getting is it would be the same. I've tested it on Prolene. I'm not asking him about Prolene. I'm asking him about oxidized Prolene.

BY MR. BOWMAN:

Q. Doctor, I would be more --

MR. HUTCHINSON: I understand that. But

that's my objection, and that's going to be my instruction. So this is the last time, Counsel. I just want to make sure we all understand.

BY MR. BOWMAN:

Q. Do you need me to re-ask the question?

A. I do, and then I need for my attorney to tell me whether I need to answer it again, because I have answered it three times, but go ahead.

Q. This before cleaning FTIR has two bands, has an area that could show a carboxyl group and an area that could show a carbonyl group that could both be associated with oxidized Prolene; is that right?

A. When you say "could," you're making an assumption that if they were there, that would be where they would be located. That is probably a reasonable assumption, but they're not there is what I'm trying to tell you, because I've taken it through five steps, and I've identified it with FTIR, five steps. They're not there. It wasn't there.

Q. Well, this is the before cleaning.

A. Yes, it is.

Q. So we can go to the next one now. That

would be fine. If we went to Exhibit 7, --

A. Sure.

Q. -- I'm sorry -- figure 7. Now, figure 7 actually shows -- that's the tissue before fibers, correct?

A. This is the tissue between fibers.

Q. Between fibers. And it's overlaid with collagenase reference, and we've already talked about that.

A. And what I wanted to show you, now, listen carefully --

Q. I do have a question coming, and I think you know what it is.

MR. HUTCHINSON: Perfect, but the witness is going to finish his answer. So, Dr. Thames, you finish your answer.

MR. BOWMAN: Well, he's already given me the explanation for this figure.

MR. HUTCHINSON: I'm telling you, Counsel, right now that the witness is going to finish his answer.

So, Dr. Thames, finish your answer.

THE WITNESS: You asked about this. And the 1742 peak -- this is to show you that the 1742 peak is present in tissue between the

fibers and it's not associated with the fiber. So, therefore, it cannot be DLTDP.

MR. MONSOUR: Would you repeat that?

THE WITNESS: Yes, I will. If you assume there's a mesh and you've got strands of mesh and then between that you've got tissue, well, we took an FTIR of that tissue, not on the fiber, but that tissue. And this is the spectra you see here in blue. It says between the fibers. It clearly shows the 1740 peak.

MR. MONSOUR: Where you say "between the fibers," is that --

THE WITNESS: It's right here, blue, the tissue between fibers.

MR. MONSOUR: Okay.

THE WITNESS: And it shows you the 1740 peak. That wasn't taken in an area where there was a fiber. You go to the reference Notter and Stuart, and they will show you this spectra at 1740 for decomposed flesh.

BY MR. BOWMAN:

Q. I understand your answer, Doctor. Thank you.

MR. HUTCHINSON: Why don't we take a

quick break?

(A BREAK WAS TAKEN.)

MR. BOWMAN: Back on the record.

BY MR. BOWMAN:

Q. Doctor, Exhibit 3, page 7, figure 7.

A. Yes, sir.

Q. Just so I have some clarity, figure 7 is a before cleaning tissue between fibers FTIR, and that is in blue and then some collagenase?

A. That's a reference spectra, yes.

Q. It's a reference spectra, and that's in red?

A. Yes, sir.

Q. And I believe before we took a break you indicated that the FTIR for the tissue, there was no chance that there were fibers in there?

A. That's correct.

Q. Were you there when the FTIR was taken?

A. No, sir.

Q. But your assistant was, and he -- do we have a picture of that FTIR?

A. Sure. It's somewhere. We've shown it several times.

Q. So I saw the -- so on page 6, upper right-hand corner of that figure, there is sort of

like a target of where that was taken?

A. He just didn't do that here. I don't know why. I gather it was because it was between the tissues. But the point -- we talked about this. And I said, "Look, we need to make certain that this is not in the area of the fibers, the Prolene," and we did -- he did, and that's the spectra that was accrued from it.

Q. Okay. Figure 8, there is a -- it indicates that in blue there is a before cleaning tissue between fibers.

Do you see that?

A. I do.

Q. And it indicates that in red there was a before cleaning blue fiber?

A. Uh-huh (affirmative response).

Q. And it says "FTIR micro."

What does "FTIR micro" mean?

A. Well, it's done with an FTIR spectrometer, but it's a microscope where you can zero-in on a very small portion.

Q. And do you know which portion they zeroed-in on for this?

A. I guess the blue fiber. And the red, it doesn't -- he looked at the fiber and made certain

that he was on a fiber, and the blue spectra he made certain that he was between the fibers. And that's the two spectra.

Q. So you're saying that -- so because there wasn't a photo taken, we have no way of knowing what portion of the blue fiber was analyzed for this?

A. No, sir.

Q. No, sir, there isn't any way to find out or --

A. If he didn't put it on here, he didn't take a picture of it. But I will ask him, if you'll make a note. But I'm pretty sure that will not be the case.

Q. So, again, these are two before cleaning shots, correct?

A. Yes, sir.

Q. And then we go to image 9 -- I'm sorry -- figure 9.

A. Yes, sir.

Q. And it is all of the cleaning steps in different colors?

A. For the blue fiber.

Q. For the blue fiber; is that right?

A. Yes, sir.

Q. Now, was a single FTIR run after each

cleaning step?

A. Yes, sir, this is it. There are five of them.

Q. So the reason why I ask the question is because sometimes I see FTIRs, and they are run with 20 or 30, and then the best line is plotted. That didn't happen in this case?

A. No, sir.

Q. Sometimes I see them with a thousand and then the best line is plotted. That didn't happen in this case?

A. Well, it did happen in the sense that we have an FTIR machine that does do something like multiple of 62 scans, and then the computer brings it down to the most likely spectra. So it's highly efficient FTIR.

Q. As part of your protocol for taking FTIR analysis, was the protocol to find the same point on the blue fiber?

A. As best you could, but you can't depend on that.

Q. So am I to understand that even though we have the five cleaning -- the five FTIRs taken after the five cleanings for the blue fiber, each one of these FTIRs could be representative of a different

portion of the mesh; is that right?

A. It's possible.

(Interruption due to speaker phone.)

BY MR. BOWMAN:

Q. So I'm going to reask my question, if that's all right, Doctor.

With respect to figure 9, we do not know if the same area on the blue fiber was run at every interval?

A. That is correct, sir.

Q. And we just know that it was run on blue fiber?

A. That is correct.

Q. Why did you choose to check blue fiber instead of -- why did you separate out blue fiber from clear fiber?

A. Well, clear fiber is the next spectra down here.

Q. Well, that's my question. Why did you separate them? Why did you make a distinction between blue and clear?

A. Why could you not make a distinction between them?

My point is, what we want to do is see if the blue fiber was clean and if the clear fiber was

clean, both of them.

So the logical thing to do is take the blue fiber and carry it through the cleaning protocol and see each step, each FTIR, and say, okay, it was clean. Now, let's see if the same thing happened to the clear fiber.

The way you're talking, I would have blue and clear spectra mixed up with each other.

Q. That's really my question, which is that -- and I do want to take -- I want to take it back one step.

You had your assistant separate the blue fiber from the clear fiber and then run FTIR on them?

A. Yes, sir.

Q. So he chose or did you choose which fiber to undo?

A. Well, you don't necessarily have to undo them. You can take a sample of fiber that's still in the weave net and run an FTIR on it.

Q. That's my understanding as well. I guess my question is, what I'm hearing you say is that it was separated out?

A. No. What was separated was that the blue fiber spectra was run, and then the clear fiber

spectra was run. And that's separating them in the sense that I want to get individual spectra from each of these two fibers at each cleaning stage.

Q. But the mesh was only cleaned five times, and the fibers weren't separated from the mesh?

A. In some cases, they were because they fell apart. But you're asking about this specific instance.

Q. I am.

A. And I don't know the answer to that.

Q. How can we find out?

A. Ask him. I can ask him. He would not have done that intentionally, unless it just happened during the course of getting this thing five times. You see what I'm saying? They cleaned it, sent it back, and then we sent it back. But he would not have intentionally separated fibers.

Q. I understand.

But you did want FTIRs run separately?

A. Yes, I did.

Q. Okay. With respect to figure 9, can you tell me what you see, why you've highlighted in blue on the left-hand of the scan?

A. Yes, sir. What we were highlighting is to show the peaks at 3291.

Do you see at the top of that?

Q. I do.

A. Okay. That's 3300. That's a little N-H peak there. And you want to see the proteins that were there. And, also, you'll see the 1742 peak, and that comes from the decomposition products that we've talked about.

And so what we really want to see is the proteins to go away as we clean it. And as you go down, then you'll see there is no peak at -- protein peak available at -- when you get down to like three, four and five. This is very efficient. It didn't take very many steps to clean this explant, quite honestly.

Q. And with respect to the area between 3600 and, let's say, 3000, do you see any area in there that might be indicative of a hydroxyl group?

A. No, not that I can define as one, no, sir.

Q. Not in any of the colors after any of these cleanings?

A. Not that I can find one, no, sir.

Q. With respect to the area that you've highlighted in the right of the scan, can you tell me why you highlighted it on the right of the scan?

A. Well, that's 1742. It shows that peak of

decomposition that I wanted to show you. It's unique. Only the explants that had the decomposition shows there.

Q. And I understand that that's what you told me previously. But didn't the -- isn't the FTIR from the tissue only? Isn't that a little different than the peak here?

A. Well, we've got -- let's go back and look at the FTIR. We've got tissue and explants.

On figure 7, we have a before cleaning tissue between fibers. Then on figure 8, we have a between fibers before cleaning. Let's see. We have the clear fiber before cleaning on figure 6, and you see the 1740 peak there.

Q. So looking at figure 6, 1740 is there and so is 1650; is that right?

A. Yes, sir, that's proteins.

Q. Is there a peak at 1650?

A. Yes, sir.

Q. Is that peak in any way indicative of carbonyl?

A. Yes, sir, from proteins.

Q. From proteins.

Now, with respect to the peak that is at 1740 in 6, is that indicative of carbonyl?

A. 1740, yes, sir.

Q. If we look at figure 9, that doesn't look -- the original Stubblefield -- the before cleaning for blue fiber looks a lot different than figure 6 does, doesn't it?

A. Wait a minute. Figure six?

Q. Yeah. We were just looking at figure 6.

A. It's hard to see. It doesn't look a lot different. What I'm looking at here on paper is in gold, and it may be a little bit more prominent on your computer.

But, no, sir, it doesn't look a whole lot of difference at all. It's just the intensity of -- the resolution of the spectra here on page 8 is a little bit better than on page 6.

Q. I was actually asking you to compare 6 to 9. But we can look on the same page. You don't need to go to 6 for that because they're both there, because 6 is of clear fiber as well.

So the difference between the reading that we got on the clear fiber for 9, the peaks are still there, right? There is just much more of them?

A. Yeah, and that's because you've got so much flesh there.

Q. On the blue fiber?

A. Well, on both of them. You've got tremendous -- we're referring back to figure 6. You've got a tremendous amount of flesh there that hasn't had anything done to it, so... And you still get those peaks in figures 9 and 10.

Q. Right. I think that figure 8 and 9 -- oh, 9 and 10 are the two I'm looking at.

A. Figures 9 and 10.

Q. Yes. So the peaks are still there. And, actually, the blue fiber -- I'm sorry. The clear fiber in figure 10 is -- the before cleaning actually is representative of what's in figure 6?

A. Yes, sir. And you see how those peaks go away, the protein peaks go away as we clean it?

Q. I do see that. Now, with respect to the fact that the blue fiber has higher peaks on it than -- higher peaks at the 1650, 1660 range, do you see that, between figure 9 and figure 10?

A. Which peak are you looking to, sir?

Q. 1650, 1660, right around there.

A. Yes. That could be -- you know, it's very difficult. This is a qualitative technique here. Don't misunderstand this for being quantitative. It's qualitative. So the fact that it's there, in order for it to be the same height, it would've had

to have been in the same concentration. It's not necessarily in the same concentration because it's not quantitative.

Q. Does that have anything to do with -- but both of these peaks, the 1740 area and the 1650 area on both the clear and the blue, these are the areas where you would expect to find carbonyls; is that right?

A. That's correct. And that's where you would also expect to find oxidation if there was any.

Q. That's right. So oxidation if there was any.

And if we look at the first -- the difference between the first and the second -- I'm sorry. Let me strike that.

Can you think of any reason why, just considering oxidation alone, why the blue fiber would have a much higher peak around the 1660, 1650 area than why the clear fiber would have -- I need to strike that.

Can you think of a reason why the carbonyl peaks in the blue fiber are higher than the carbonyl peaks in the clear fiber?

A. Sure. As I said, this is a qualitative

technique and not a quantitative technique. And in order for the fibers to have exactly the same peak heights, there would've had to have been two areas where the amount of protein was exactly the same in the blue as the clear. And the likelihood of finding that is remote.

Q. The amount of tissue between the two; is that right? Is that what you were saying? I'm sorry.

A. Well, I don't think you're listening to me.

Q. Okay. I'm trying to.

A. I'm trying to be pretty clear. Please listen to me.

Q. I'm listening.

A. FTIR is a qualitative technique. You're asking me to compare two spectra, one on one fiber and one on a completely different fiber. And you're asking me why the peak heights at a particular frequency is not the same. And I'm telling you that in order to be the same, the concentration at the two different -- in the two different figures would have to be the same.

Well, since this is a qualitative technique and we reach over and take a fiber and we

run an FTIR on it, we can't say, well, the concentration of the protein at this site in figure 9 is exactly the same concentration of the protein over in figure 10.

But the fact that they both occur at that frequency says that protein is still there. And that's what we're interested in telling you. Is protein still there? And the answer is "yes."

Q. Did you take into account that copper is used in the blue pigment when you came to that determination?

A. That's over in seven -- like, if you look over here at the blue fiber spectra, do you see it over here, this peak, this red in the 700-region that's not marked?

Q. Yes.

A. And you look down at the clear fiber and it's not there, that says this is blue and this is clear.

Q. I meant with respect to the blue fiber.

Does the addition of copper to the blue fiber, does that accelerate any kind of oxidation reaction at all?

A. Oh, no, no.

Q. So did you take that into account when you

made that determination here that there wasn't any oxidation on this sample?

A. Well, I took it into account in the sense that I would see no reason under the sun or any knowledge that I have why a pigment, the phthalocyanine pigment we're talking about here, would have any adverse effect in terms of oxidation on anything, particularly these fibers.

Q. Even if it was copper-based?

A. Yes.

Q. So with respect to the FTIRs that you performed and with the cleaning process, you're satisfied that the samples that you examined for Ms. Stubblefield contained no oxidized Prolene; is that right?

A. That is correct.

Q. How many different sample sites did you take of the mesh that she had for FTIR?

A. I can't give you the exact number.

Q. I think we already established --

A. I think every site would be different. You just can't identify -- when you're doing an FTIR micro-spectra, you can't identify where that particular site is and be assured that you're going to go back to that exact site after you've taken

that explant and sent it to Philadelphia and they've done their thing and sent it back to you.

Q. With respect to your conclusions about SEM analysis, Doctor, --

A. SEM analysis?

Q. Yes. There were some conclusions on page 11.

A. Okay.

Q. Are you with me?

A. I am, sir. But the SEMs are actually on page 12.

Q. They are. The conclusions begin there, and then they go to the next. So can you tell me -- well, I'm just going to read it into the record.

Your report at the top of page 12 states, "If the surface of the Prolene fibers had degraded as postulated by plaintiff's expert, the extrusion lines would degrade during this process and would no longer be visible. That is not the case we observed."

Do you see that?

A. Yeah.

Q. Can you tell me any support for that statement that you might have?

A. That's my belief.

Q. Okay. Have you reviewed any explants from plaintiffs' experts while you came up with this belief?

A. Well, every explant that I have reviewed and looked at the way we've done today, first of all, I've never seen oxidation; and, secondly, I've always seen pristine extrusion lines, which would be expected with no oxidation.

If oxidation had occurred, you would have at least seen pitting or something, a disfigurement, and I haven't seen that.

Q. You didn't see that in any of the pictures that you took of Ms. Stubblefield's mesh; is that right?

A. No, sir.

MR. BOWMAN: I think I'm done with Ms. Stubblefield.

THE WITNESS: Okay, sir.

MR. HUTCHINSON: Dr. Thames, I have some follow-up questions for you.

EXAMINATION

BY MR. HUTCHINSON:

Q. If you don't mind, if you'll look at Exhibit 2, please.

A. Yes, sir.

Q. You were asked questions about a document that Exponent created entitled, "Protocol for Cleaning Surgical Meshes."

Do you recall that?

A. Yes, I do.

Q. Dr. Thames, have you had a chance to look at this document now?

A. Briefly, yes, sir.

Q. And is the purpose of this protocol to provide general guidance in the cleaning process for those who worked at Exponent?

A. That's what it says to me. It says, "To evaluate the effects of different cleaning methods on clean surface texture and chemistry of the mesh material."

Q. So this would cover a broad scope on how to clean meshes, correct?

A. Yes, sir.

Q. Doctor, did the protocol for cleaning Ms. Stubblefield's mesh explant use various chemicals?

A. Yes.

Q. And I believe we talked about those.

Sodium hypochlorite, Proteinase K and water, are those the chemicals that were used?

A. They used those plus others.
Q. Doctor, are those chemicals described in Exhibit 2 to your deposition entitled, "Protocol for Cleaning Surgical Meshes," that was created by Exponent?
A. Yes.
Q. And was used by Exponent?
A. Yes.
Q. And, Doctor, did you develop the protocol that was used to clean Ms. Stubblefield's explant?
A. Yes.
Q. Did Dr. Ong at Exponent use the protocol that you developed?
A. Yes.
Q. And did he use that protocol to clean Ms. Stubblefield's explant?
A. Yes.
Q. And was he working under your direction and control?
A. Yes.
Q. And, Dr. Thames, is the specific protocol used to clean Ms. Stubblefield's explant contained within her case-specific expert report?
A. Yes.
Q. And is that the specific protocol that we

see on page 2?

A. Yes.

Q. Doctor, if we look at page 5 of your expert report for Ms. Stubblefield, are you there with me?

A. Yes, I am.

Q. Doctor, there's a blue and white light microscopy photo at the top; is that correct?

A. Yes, sir.

Q. And, Doctor, you were asked whether your opinions about figure 5 on page 5 were supported by peer-reviewed literature.

Do you recall that question?

A. Yes, I do.

Q. And, Dr. Thames, do you believe, to a reasonable degree of scientific certainty, that the peeling material shown in this figure is proteins?

A. Absolutely.

Q. And, Dr. Thames, do proteins strongly adhere to medical device products?

MR. BOWMAN: Object to form.

THE WITNESS: Yes, they do.

BY MR. HUTCHINSON:

Q. And, Doctor, is that opinion supported in the peer-reviewed literature?

A. Absolutely.

MR. BOWMAN: Object to form.

BY MR. HUTCHINSON:

Q. And, Doctor, is what we're seeing here in exhibit -- I'm sorry -- figure 5 on page 5 exactly that?

A. Yes, it is.

MR. BOWMAN: Object to form.

BY MR. HUTCHINSON:

Q. Dr. Thames, let's look at page 8 of your expect report.

Now, if we look at the yellow line on FTIR spectra on the top, what does the yellow line show?

A. It shows that there are proteins present, because it says before cleaning. And the blue fiber is gold or yellow, and it shows that there are proteins present when the cleaning process began, and it shows that there are some 1742, which means decomposition products were present.

Q. And, Dr. Thames, what happened to the proteins on Ms. Stubblefield's explant as the cleaning process progressed?

MR. BOWMAN: Object to form.

THE WITNESS: They were removed. They were cleaned and no longer there, and that's

what this progression of FTIR spectra shows.

BY MR. HUTCHINSON:

Q. And, Doctor, let's look on page 9.

We see another FTIR spectra here; is that correct?

A. Yes, you do.

Q. And I believe I see two blue lines, one red -- I'm sorry. Strike that.

I believe I see two lines, one red and one blue; is that right?

A. Yes, sir.

Q. What does the blue line represent?

A. It is the exemplar that's been through the five cleaning steps that we're talking about.

Q. And what does the red line represent?

A. It's after cleaning blue fiber.

Q. And, Doctor, what relationship do these red and blue lines have to each other on the FTIR analysis?

A. They are identical.

Q. And, Doctor, what does that tell you as a material scientist about whether or not Ms. Stubblefield's mesh oxidized?

MR. BOWMAN: Object to form.

THE WITNESS: It shows me unequivocally

that her mesh did not oxidize.

BY MR. HUTCHINSON:

Q. Why does it show you that?

A. There's no carbonyl frequency showing in this spectra, and certainly it's not an exemplar.

MR. HUTCHINSON: I don't have any further questions. Thank you.

MR. BOWMAN: I have a couple of follow-ups.

FURTHER EXAMINATION

BY MR. BOWMAN:

Q. With respect to handling of the meshes, did you ever handle any of these meshes for Ms. Stubblefield?

A. No.

Q. Did you ever perform any kind of --

A. I looked at them, but I didn't handle them. I put the tweezer on them, moved them around, but I did not handle them as such.

Q. Did you ever perform any kind of tensile testing on these meshes?

A. Sir, we didn't have anywhere close to the amount of material to perform a tensile test on it, I mean, not even close.

Q. With respect to the explanted sample, were

there any tests that you -- I'm sorry.

With respect to the explanted sample after it had been run through the cleaning process for the fifth time, did you compare it to the pristine Gynemesh in any other way, other than the FTIR that is represented in figure 11?

A. FTIR, SEM and light microscopy.

Q. And the SEM and FTIR and light microscopy, were they done -- how were they done?

A. Well, light microscopy was done with a light microscope, and the scanning electron microscopy was done with environmental scanning electron microscope.

Q. I'll be more clear. Were pictures taken of the entire sample?

A. With those devices?

Q. With those devices.

A. With the light microscope we had pictures taken of them, but that was not the case with SEM.

Q. So if there was pitting or if this was cracking or if there was some kind of disturbance on the mesh after it had gone through the five cleaning processes that you determined needed to be done, how would you explain this?

A. It would be shown on one or more of these

fibers.

Q. So even though the FTIR, as you just said a minute ago, is exactly the same as the exemplar Gynemesh, those kinds of defects, how would you explain those?

A. Well, if we have oxidation occurring, it shouldn't be unique to a specific site. We should see -- at somewhere along the line of those five explants, we should have seen an occurrence of a peak that never showed up. And it never showed up, and it certainly wasn't there after number five.

If it had been present, covered up by a protein or something of that sort, it would not have been washed away. It was never shown up, so it wasn't there.

Q. That's what I'm asking you.

Did you take SEMs of the entire clean Gynemesh that was taken out of Ms. Stubblefield?

A. We took a number of SEMs, and you have those. We only have a few representative spectra here. And we looked it all over, yes, sir.

But I can't say that every square centimeter -- no, I'll go better that -- millimeter, because we didn't have much, was looked at and a picture taken.

Q. And you'll agree with me that -- well, that mesh hasn't been destroyed, has it?

A. No, sir.

Q. Now, you'll agree with me that even the FTIR, it's a one-shot analysis; is that right?

MR. HUTCHINSON: Object to form.

BY MR. BOWMAN:

Q. You pick one point and do the FTIR?

A. It's a one-shot analysis, but I did it five times.

Q. Possibly at five different places, correct?

A. Yeah. And, also, we've got SEMs that are certainly more than we have here, and we never saw anything that had a carbonyl band or any pitting or cracking or this explant. And so if there had been any there, I would have found it.

Q. Oh, did you go looking for it?

A. I did look for it. That's why I did this report, is to find out if it was there, sir.

Q. On the final cleaning sample from Ms. Stubblefield, did you go looking for pitting and cracking on the supposedly cleaned, exactly the same as Gynemesh exemplar portion of mesh that you cleaned?

A. We had nothing to hide with this analyses, and we were looking to see what kind of condition this explant was in. And we have provided for you as reasonable a depiction of the condition of this explant as we can possibly do.

MR. BOWMAN: Okay. Thank you. I have no more questions.

(CONCLUDED AT 2:31 P.M.)

CERTIFICATE OF COURT REPORTER

I, Amy M. Key, CSR, and Notary Public in and for the County of Lamar, State of Mississippi, hereby certify that the foregoing pages, under penalty of perjury, contain a true and correct transcript of the testimony of the witness, as taken by me at the time and place heretofore stated, and later reduced to typewritten form by computer-aided transcription under my supervision and to the best of my skill and ability.

I further certify that I placed the witness under oath to truthfully answer the questions in this matter under the power vested in me by the State of Mississippi.

I further certify that I am not in the employ of or related to any counsel or party in this matter, and have no interest, monetary or otherwise, in the final outcome of the proceedings.

Witness my signature and seal this the _____ day of_____, 2016.

_____

AMY M. KEY, CSR

My Commission Expires June 19, 2016

SIGNATURE OF WITNESS

I, _____, do solemnly swear that I have read the foregoing pages and that the same is a true and correct transcript of the testimony given by me at the time and place hereinbefore set forth, with the following corrections:

PAGE:	LINE:	SHOULD READ:	REASON FOR CHANGE:
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(SIGNATURE)

Subscribed and sworn
to before me this
_____ day of _____, 20____.
My commission expires:_____

_____
Notary Public